How Many Human Factors Influenced the June 30, 2013, Yarnell Hill Fire 19 Fatalities and Yet Were Never Investigated Nor Documented?

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Abstract. Wildland firefighting is inherently dangerous, fraught with simple mishaps to inevitable fatal outcomes for the unwary. Established, sound rules and guidelines will continue to work to keep Wildland Firefighters and Firefighters safe. Human factors, consistent across all work groups, are variously broken down into human errors, human failures, error chain(s), etc. making fatalities unavoidable. All we can do is reduce them. Nineteen Prescott FD Granite Mountain Hot Shot wildland firefighters and supervisors perished on the June 2013 Yarnell Hill Fire in Arizona. Inexplicably, they left their Safety Zone during explosive fire behavior. A Serious Accident Investigation Team found, "… no indication of negligence, reckless actions, or violations of policy or protocol." The authors and others infer: the final, fatal link, in a long chain of bad decisions with good outcomes. Among other things, tunnel vision, auditory exclusion, goal fixation, non-critical thinking, destructive goal pursuit, Groupthink, and "Friendly Fire" are discussed.

Keywords: Yarnell Hill Fire · Wildland firefighting · Friendly fire · Human factors

1 Introduction

How is it possible that 19 wildland firefighters perished on the Arizona State Forestry (ASF) Yarnell Hill (YH) Fire in one fell swoop, yet the *USFS federally-funded* Serious Accident Investigation Team and Report (SAIT-SAIR) boldly and unbelievably concluded that they found "… ***no indication of negligence, reckless actions, or violations of policy or protocol***"? (emphasis added) [1–3]. Additionally, "3. The Team recommends … develop[ing] a ***wildland fire staff ride*** for the Yarnell Hill Fire incident. The staff ride is a process of conveying the lessons learned from this incident for future fire leaders." Furthermore, "5. The Team recommends that the State of Arizona request the NWCG and/or Wildland Fire Leadership Council (WFLC) to **charter a team of interagency**

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wildland fire and *human factors* experts to conduct further analysis of this event and the wildland fire communications environment." (emphasis added) [1–3].

Human factors refer to environmental, organizational and job factors, and human and individual characteristics, which influence behavior at work in a way which can positively or adversely affect safety [5]. The Staff Ride is a stellar idea, brought to fruition more from a mandated court order than from this SAIT recommendation [4]. However, it's been reported that the "*official*" ones were fairly restrictive and required to use and follow the "*official*" SAIR, thus impeding any valid lessons learned [4]. And the interagency team of "*human factors experts*"? Likely discussed but certainly never taken on to completion. And so, the authors and others (e.g. InvestigativeMEDIA, Yarnell Hill Fire Revelations) took it upon themselves to accept and attend to this crucial task [4].

There will always be a continuing need for dedicated research on the Yarnell Hill (YH) Fire fatalities, seeking out and gathering newly revealed public records evidence regarding the causal human factors and human errors ignored in the alleged "investigation." Some WFs, FFs, and slightly inquisitive others are still unsure whether there was a rogue firing (burning out) operation in the Sesame Street and Shrine Fuel-Fire Break Corridor. This is informally referred to in the insensitively-named Serious Accident Investigation Team "Factual and Management Report" (SAIT-SAIR) as the "the two-track road (an old fuel break) between Sesame Street and Shrine Road … preparing for burnout along the dozer line." [3]. Some GMHS family, friends, and loved ones, are grudgingly aware of it, and prefer to euphemistically (and incorrectly) refer to it as a "back burn." [4] (i.e. *"I stand firm that there was a back burn that came up that canyon. It was this fact along with the weather change that the IC never sent out because they were busy evacuating that caused the death of Granite Mountain.")* [4]. This is a wishful yet out-of-place sentiment. Allegedly "*evacuating*" had nothing to do with their deaths! Undeniably, from their viable Safety Zone in the black, they had the best vantage point of anyone on the fire (except Air Attack), of the increasingly adverse weather and the resultant aggressive fire behavior that deceived them. The GMHS veterans knew better!

Because of all this, WFs, FFs, and others will continue to struggle to make sense of the June 30, 2013, YH Fire; the "*how and why*" 19 of the 20 Granite Mountain Hot Shot (GMHS) fatalities. We all certainly know *how* they died. However, there is a rightful need to analyze *why* so many died needlessly and *why* key evidence is concealed, impeding lessons learned; all the while restricting YH Fire-informed and -knowledgeable USFS employees from talking about or legally being questioned for the tragedy [4].

1.1 Background

The magnitude and complexity of the fire itself and of the human response to it will vary because fire operations are inherently dangerous and will never change [6]. The risk to wildland firefighters (WFs) and Firefighters (FFs) has increased in recent years largely due to large fires have been reported in the Wildland Urban Interface (WUI); "where structures and other human development meet or intermingle with wildland or vegetative fuels." [7]. Was there a rogue firing operation below them in the Sesame Street and Shrine Fuel-Fire Break Corridor areas that they were unaware of because they had no lookout or failed to notify Air Attack? Or because those involved with the several firing operations never informed anyone? Likely all of them. This was a

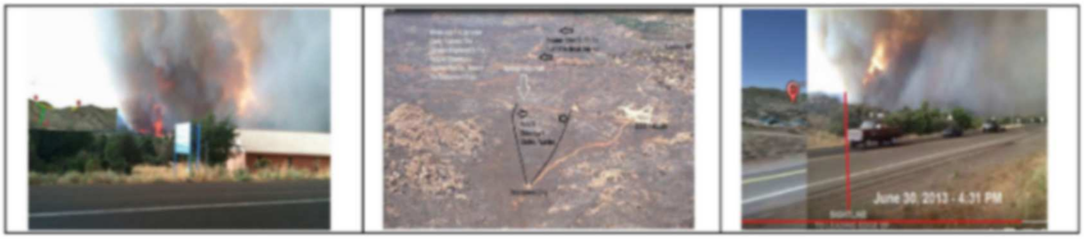

Fig. 1. Left (**1a**) photo - intense fire behavior 6/30/13 at 1629 h. from Assembly of God church along Hwy. 89 with Google Earth overlay - right icon is GMHS location, left icon is GMHS-descent point, lower icons are GMHS deployment/fatality site (DZ) and Helms (BSR) **Source:** Lauber, WTKTT, Google Earth. Middle (**1b**) photo - Enhanced Google Earth snippet image using Paint, aligned northwest, Sesame - Shrine Corridor leading to parallel twin chutes funneling upslope to GMHS DZ. **Source:** Google Earth, Collura. Right photo (**1c**) intense fire behavior 6/30/13 at 1631 h. along Hwy. 89. "D" is GMHS DZ **Source:** ABC News, WTKTT

clear sign of the normalization of deviance, drifting into failure; a progressive series of elements in a long chain of bad decisions with good outcomes setting up their inevitable fatal entrapment outcome [1, 2, 4, 7–9]. These factors may have impeded their decision-making: (1) cultural influences of municipal fire departments with collateral wildland fire responsibilities to "save structures" at all costs and consider FF safety as a "last resort;" [9] (2) known, obvious unsafe GMHS leadership concerns; (3) weak Crew cohesion that relied on consensus-seeking ("absence of leadership"); and (4) failing to know the situation(s) were getting out-of-hand (snowball effect), thus losing the ability to detect they were cognitively overloaded and needed to change plans or disengage [10]. One even deemed it "*an accident, just one of those things that happen.*" [9].

1.2 Motivation

Human Factors expert, Dr. Ted Putnam, wrote: Generally, the goal of accident reports is to convey as much of the truth of an event that is discoverable. Sometimes investigators deliberately distort or do not report all the causal elements, leading firefighters to distrust these reports, which can hamper our efforts to stay safe [4, 11]. 'Wildland firefighting is a high-risk occupation, shown each year by deaths or injuries in the line of duty. Identifying causal human factors to mitigate them in the future is critical.' [6]. The authors allege the USDA has been exceptionally deceptive. Given all this, how are true, intended complete "lessons learned" possible? Veteran WF Bruce Hensler points out that it does no good to identify or share any "lessons learned" if the industry that needs to learn them refuses to do so [12]. Putnam believes [WFs] will continue to die as long as they fail to come to terms with certain realities by acknowledging … the ***recurring failure to learn from lessons***." (emphasis added) [11].

2 The Sesame Street and Shrine Fuel/Fire Break Corridor Area(s) Firing Operations

At least twenty (20) people, including veteran WFs and FFs and the two YH Fire hikers watched a video in July 2013 at the Yarnell, AZ Library of a Sesame Street and Shrine

Corridor firing operation; also viewed by one FF on YouTube before it was removed. The video abruptly vanished without a trace, like other YH Fire evidence. There were also burnt fusees (firing devices akin to large road flares) found on a 2014 site visit and a GMHS family member found "*accelerants*" with specialized dogs another time [4].

Former YFD Fire Chief Peter Andersen (RiP) validated: "we built an emergency escape route for Yarnell ***in case there was a burnout like this*** … in that area below The Shrine, west of The Shrine, they had dozers back there widening that so that it would create a fire break, …" [13] WFs and local FFs regarding it as so, acted accordingly.

3 Wildland Firefighting Rules - Human Factors, Human Errors, and Human Failures

All WFs are trained in specific rules, crucial to follow to ensure good direction, leadership, safety, and vigilance. The strict Standard Firefighting Orders, organized purposely and sequentially, are to be carried out sensibly on all wildfires [1–3]. The 18 Watch Out Situations, (i.e. guidelines), are faced on all fires, more to warn of impending dangers. The authors and experienced WFs contend that knowing and abiding by the wildland firefighting rules works. They urge sound leadership and safe decisions [6]. There are no documented wildfire fatalities when the Standard Firefighting Orders are followed and the cautionary 18 Watch Out Situations ("10 & 18") are mitigated [14]. Sadly, there is a crusade afoot by current and former WFs and Managers to discredit these based on the SAIT conclusion, i.e. *"they did everything right and still died."* [4].

The most critical of the established Wildland Fighting Rules are listed in the (NWCG) Incident Response Pocket Guide (IRPG) [1, 2, 15]. Again, if WFs follow the Standard Firefighting Orders and are alerted to the 18 Watch Out Situations, much of the risk of firefighting can be reduced saving tens of thousands of WF lives each fire season [1, 4]. It is well-known and accepted in the WF community that these tried and tested rules work when applied consistently and with sound, decisive judgement [1, 2, 4, 6, 9].

Inexplicably, the National Interagency Fire Center (NIFC) urged YH Fire investigators to ***withhold some findings from the public,*** and to ***avoid analyzing whether crews violated fundamental fire-line rules*** in the AZ Republic (NPR) [16]. Restating, there are high-level criticisms by some alleged WF "*leaders,*" by way of the Wildland Fire LLC (WFLLC), that the WF Rules "*cannot work … not going to keep us safe*" and we need to rely on "*luck decision conversations.*" [15]. The authors and most WFs agree on the validity of the WF Rules, disregarding "*luck decisions.*" Abiding by defensive WF Rules and human factors is missing in most fatal wildfire investigation reports [14].

When asked by ADOSH investigators, alleged GMHS "lookout" McDonough, just moments after admitting that it was 'policy' for the GMHS to always '*risk a lot to save a lot*' in Wildland Firefighting (i.e. Fight fire aggressively, having provided for safety first, the 10&18, LCES, etc.) - he said: *"It's – it's hillbilly. It's what it is. … It's old. It's, uh, no offense to whoever came up with that, um, I mean no disrespect to anybody, but, I mean, it is the way they fight wildland fires today … is, I mean … Oh it's … We're smart. We're a lot smarter."* [17]. So smart, that with this cavalier safety attitude, his entire Crew, except one, was killed! In his book defending his Brothers' actions, he confirms this, *never* citing safety rules. A third year GMHS had to be coached on this.

Consider now (below) several of the human factors inferred from the text above.

3.1 Willingness to Properly Refuse Risk and Turn Down Protocol

It is largely agreed that wildland firefighting is a quasi-military venture; one is to obey orders unless unsafe, illegal, unethical, or immoral [1, 2]. It is located in the IRPG (p. 19) [16]. Confidently, it is safe to say that *all* WFs and FFs (notably supervisors) will be placed in these situations during their careers. *Most importantly, in every instance, they mustsatisfy their supervisory duties to ensure their respective individual and shared safety and welfare - no matter what!* So then, *why* did the GMHS fail to heed this on June 30th?

3.2 Plan continuation Bias

A potent, unconscious cognitive penchant, impeded the GMHS' ability to know they needed to change their course of action. Avalanche fatality scholars note people generally have a strong bias for sticking with what they have now and let their minds default to what is given or what has already been decided. They rely on stay-the-course impulses all the time, often with deceptively satisfactory results [18].

According to a Wildland Fire Safety Training Refresher (WFSTAR) poster, it was '*52 min from the blowup to the burnover*,' [4, 19]; yet the GMHS failed to notice obvious cues during that time period - instead "*discussing our options*," indicating that conditions were exponentially shifting - virtually screaming to them to '*stay in the black*.'

3.3 Steady Drift Into Failure Via Bad Decisions With Prior Good Outcomes

Several instances of GMHS hazardous attitudes and actions support their drift into failure spanning from their first official Hot Shot status season in 2009 up until the YH Fire in 2013. These involved a repeated attitude of having to "*prove themselves*" or "*one-up*" other HS Crews on fires, conspicuously due to their Municipal FD status [9].

On the 2012 Holloway Fire in NV, their Crew Carriers were saved by an Oregon-based Contract Engine Crew in this VIMEO video. (http://vimeo.com/48411010) [9]. Based on acquired public records, this was the second of three times another Crew had to "*save*" their Crew carriers - on the Holloway, Sunflower, and YH Fires [9].

GMHS Brandon Bunch was sick and tired of the GMHS Supt. always acting like he had '*something to prove*.' "[H]e felt that under Marsh's command, the Hotshots were always having to prove themselves" (p. 54) [20]. Is it safe to infer that the GMHS *normalized* deviance again and again? Or more so with sneaky good outcomes? [1, 2, 4, 9].

3.4 Consequences of Inattention as Causal Factor

Credible research on '*inattentional blindness*' (IB) reveals that when someone is otherwise engaged, at times they fail to "see" obvious clear, fully visible, yet unexpected objects or events, IB also leads one to miss items that one *needed* to experience [2]. If an event meets their belief(s), they may be more likely to exhibit IB for a sudden, possible critical visual event [2]. *At least two of them had to take notice* [2]. This likely occurred as they discounted so many signs and - *minus a lookout or notifying Air Attack - hiked* *downhill into the friendly fire, raging uphill fire behavior from the likely Sesame Street - Shrine firing operation.* (Fig. 1) [21]. AFUE transcripts show Marsh ordered air support ahead of GMHS [4].

3.5 Tunnel Vision and Auditory Exclusion

According to John Hopkins Univ. researchers Yantis and others, "*When attention is deployed to one modality, it necessarily extracts a cost on another modality. The brain can't simultaneously give full attention to both.*" [21]. When the subjects directed their interest to visual tasks ("*tunneling in*"), the parts of the brain that record auditory stimuli registered decreased activity. And when they focused on listening to spoken messages, brain areas that respond to visual images showed less activity. Perceptual distortions can occur at any point (e.g., when the information is received, retained, or recalled). *The mind will see what it expects to see and miss or misinterpret other potentially significant details* [21].

In fact, this is an exceptionally well-known hazardous injury and fatality causal human factor requiring critical training for those in law enforcement and the military.

3.6 Groupthink

Groupthink is the mode of thinking that people engage in when they are deeply involved in a cohesive group, when the members, striving for unanimity override their motivation to realistically appraise alternative courses of action [22]. When a major proposition was the group's that displayed groupthink symptoms, this was more likely to produce poor decision outcomes, more likely to display symptoms of defective decision making, resulting in poor policy outcomes. Group decision-making and decision-making support for a commander is acceptable. Military units utilize group decision-making techniques to develop tactical plans and recommendations that assist the commander in making decisions during battle. When groups work well they are more superior to individual decision making abilities [22]. In mountaineering, a group's cohesion results from the shared pursuit of a shared goal rather than from strong social bonds between members [23]. Flawed decision making turned a hazardous summit attempt into a fatal one. Climbers fatally failed to adhere to the strict turn-around time. Favored directive leadership entails telling followers what needs to be done, and giving proper guidance along the way [23]. The authors and many WFs and FFs deem it was Groupthink that led these men to follow their leaders to their deaths.

3.7 Destructive Goal Pursuit

Ignoring potential hazards and thinking only of what you set out to achieve, sets one up for disaster. Why would a group still pursue a goal despite mounting evidence that it could not be attained? [24]. In part, because research indicates that the greater the insecurity a group feels of their chance of achieving the goal, the harder they'll try. With failure more likely, the more rooted they are [24].

Failure indicators then cause the group to put even more effort into achieving the goal. Why? It's engrained in us. The more difficult the obstacle, the greater the achievement. Goals once set, are very hard to abandon. It's difficult to let it go.

Goals also actually limit learning. Goals cause people to take risks they might not think to take otherwise. *A decisive point - wanting something badly enough can cause you to ignore your gut feelings. That's destructive goal pursuit.* Failure to develop individuals within an organization can be disastrous. Teach climbers, and thus WFs, to make sound decisions for themselves, rather than be overly reliant on their leaders.

3.8 Friendly Fire

In the military, a casualty circumstance applicable to persons killed or wounded in action mistakenly or accidentally by friendly forces. In wildland fire, there are a few familiar cases of errant firing operations to blame for WF deaths [21].

4 USDA USFS and OGC Employee "Direction" and "Guidance"

4.1 Obstructive Touhy Regulations and the Federal Housekeeping Statute

Between the "Touhy Regulations" [U.S. ex rel. Touhy v. Regan, 340 U.S. 462 (1951)] and the plenary Federal Housekeeping Statute, 5 U.S.C. § 301 [33], the USDA USFS has ensured that their BRHS and USFS AFUE employees *will not be interviewed* [4, 25].

This legal minefield ensures there will be *no 'complete lessons learned,'* described by BRHS Frisby, regarding the relevant planned Staff Ride human factors, accuracy, and veracity, as addressed in the email excerpts below. Frisby and the BRHS hold a wealth of YH Fire and GMHS information from June 30, 2013. *What is the USFS afraid of?*

4.2 USDA USFS Blue Ridge Hot Shot (BRHS) Crew and YH Fire Staff Ride

Consider excerpts from an April 2016 email from BRHS Supt. Brian Frisby to USFS National Human Dimensions Specialist Joseph Harris regarding the YH Fire Staff Ride. BRHS Supt. Frisby noted: "**the [YH Fire Staff Ride] picture being painted is very different than what we remember**" and that "**there was so much that went on that day that [was] swept under the rug**" and "**the human factors that day were off the chart.**" (emphasis added) [4] Per Touhy warning, no BRHS was ever interviewed [25].

5 Conclusion and Recommendations

"If, as teachers of history will tell us, failing to learn the lessons of the past dooms us to reliving those lessons, then we must either impress indelibly into the minds of firefighters the lessons of the South Canyon Fire or we will again experience its tragic outcome." (Gleason and Robinson, 1994)" [27]*(emphasis added) Student of Fire* [28] *commenter Matt adds: "It is unforgivable that we allow sentiment and tradition [to] prevent us from learning anything from the human factors surrounding Yarnell because*

we continue to be blinkered and sentimental in our eagerness to 'not speak ill' of the dead. It is nothing short of astonishing that the official conclusion was that everybody involved in the Yarnell Hill Fire did everything right - despite the incineration of the 19 hotshots by flames so hellish that granite boulders fractured. Covering up facts because they make us uncomfortable dishonors the dead, and ensures the same mistakes will be made in the future." [28] (emphasis added) NONE of these are "hindsight bias."

The authors made a good faith attempt to share new information regarding some of the human errors that occurred on the June 30, 2013, YH Fire with the GMHS. New evidence is revealed regularly. There are an untold number of WFs, FFs, citizens; and family, friends, and loved ones of these same individuals that hold a lot of valuable information about the historic wildland fire lie, cover-up, and whitewash in photos, videos, human factors, and lessons learned narratives that need to be brought forward and shared. These valuable facts and insights will add greatly to *true* "*lessons learned*" to reduce wildfire fatalities, replacing the "incomplete" lessons we were force-fed [8].

WFs and FFs still talk about the numerous wildland fire fatalities that *continue* to occur - from the very *same* causal factors. Staff Rides are certainly a valuable asset in the "lessons learned" toolbox to reduce them. This noteworthy, yet ignored, key sentence - entirely on point - deserves attention: "**A staff ride should avoid being a recital of a single investigation report. Such reports rarely address the human factors that affect individual decision-making. … providing participants with a variety of information sources is important** [26]. Recall that *all* wildland fire fatality investigations are based on predetermined conclusions and the Staff Rides are based on these cover-ups, lies, and whitewashes [4]. Nonetheless, the YH Fire *demands* many "information sources" so as to be even mildly factual linking the fully omitted human factors.

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